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and all the flowers pure white. This alone, we then thought well worth our thirty miles' journey on horseback; but a few weeks later, the discoverer of the plant conducted us to one of his original localities of it, near the summit of Parry's Peak in Colorado.

At the margin of a shallow pond, walled in on one side by rocks, and hidden on the other by a growth of aspens, we frightened, from his herborizing among the sedges, a fine black-tailed deer and gathered for ourselves some large specimens of the brilliant *Pedicularis Grœnlandica* Retz, and the large silvery leaves of the rare *Nardosmia sagittata* Hook. But the day was now past the meridian, and we were obliged to take leave of this interesting ground, in order to reach Cheyenne at a reasonable hour of the evening, gathering by the way, upon the lower plains, the vespertine Mentzelias and Œnotheras, which unfold their petals towards sunset, and breathe fragrance upon the air of night.

BOTANICAL OBSERVATIONS IN WESTERN WYOMING.

BY DR. C. C. PARRY.

NO. IV.—APPENDIX; DESCRIPTIONS OF NEW SPECIES, ETC.

THE numbers are those affixed to the tickets in the distributed collection, and referred to in the preceding articles. The characters or descriptions which follow are by the botanists respectively whose names are appended to their several contributions,— in which the collector, having been summoned to a remote frontier, is able to take only a small part.

3. AQUILEGIA JONESII.—Acaulescent, minutely soft-pubescent; leaves all crowded, and the persistent scale-like dilated bases of their petioles imbricated on the stout ascending branches of the rootstock, biternately divided; the primary divisions with very short if any partial petioles, and the secondary ones sessile or confluent at base, so that the nine small and obovate entire leaflets or divisions are in a dense cluster; scape from one to at length three inches high, naked, exceeding the leaves, one-flowered, sepals and petals blue; the former oblong, exceeding the gradually tapering straightish spurs; styles long, exserted; pods turgid, reticulated, smooth.—In crevices of loose arenaceous limestone, on the summit of Phlox Mountain, forming close clusters. A remarkable and most distinct, very dwarf species, collected July 18, mostly out of flower, and with full-grown fruit; but a few blossoms were secured. The species is dedicated to Capt. W. A. Jones, U. S. Engineer, who first detected this interesting species, and to whose efficient aid as Commander of the expedition the botanical collection is largely indebted for its most valuable results.—C. C. PARRY.

13. STANLEY ATOMENTOSA.—Very stout, white-villous or hirsute throughout (especially the foliage and lower part of the stem); radical and lower leaves lyrate-pinnatifid in the manner of *S. pinnatifida*, the upper ones entire and hastate, passing into lanceolate and finally into subulate bracts for the lower flowers; raceme very dense and thick, cylindrical (becoming a foot or a foot and a half long), of almost innumerable pale cream-colored flowers; pedicels in fruit about the length of the filiform stipe.—Owl Creek on dry slopes in gypseous soil. Biennial, perhaps sometimes perennial by offshoots, one to three feet high. Petals lanceolate, oblong, narrowest in the centre. Stigma green.—C. C. PARRY.

DRABA VENTOSA.—Depressed and cæspitose, branching from slender rootstocks, canescently tomentose throughout, the pubescence stellate; leaves crowded on the mostly tufted branches, spatulate oblong or obovate, entire, not rigid; peduncle in fruit exserted beyond the leaves, corymbosely 3-5-flowered; petals golden yellow; silicle oval or orbicular, tomentulose-hirsute, tipped with a short distinct style.—On a high rocky peak overlooking Snake and Wind River valleys. The larger and laxer leafy shoots are an inch and a half or more in height; the denser shorter and in a close tuft. Leaves 3 to 5 or even 6 lines long, of soft and herbaceous texture, obtuse and pointless, tapering to the base; the pubescence wholly soft and stellate, the stellular tuft generally slender-stipitate. Scape or peduncle half an inch to nearly an inch in length when fully developed. Petals obovate or spatulate, 2 lines long. Silicle fully 2 lines wide, 2½ to 3½ lines long; the abrupt style half a line to nearly a line long. The foliage is not unlike that of the imperfectly known *D. eurycarpa* Gray, of the Sierra Nevada.—A. GRAY.

65. ASTRAGALUS (ONOBRYCHOIDES) VENTORUM Gray MS.—Somewhat canescent with short appressed hairs; the stems from a subterraneous perennial rootstock, erect, 4-6 inches high, flexuous, simple; stipules large and scarious, free from the petiole, united and amplexicaul; leaflets 4-8 pairs, broadly obovate, 4-6 lines long, rounded or retuse at the apex; racemes loose, short peduncled, equalling the leaves; flowers 5-6 lines long, light yellow; the tubular-campanulate calyx 3 lines long, with short setaceously tipped teeth; legume sessile, slightly pubescent, turgid, oblong, 6-9 lines long, slightly curved, completely 2-celled, the ventral suture somewhat prominent and the dorsal slightly impressed.—Collected on Wind River; differing from the other species of the section in its habit, which is that of *A. succumbens*, in its yellowish flowers and larger legumes.—S. WATSON.

75*a*. ASTRAGALUS (PECTINATI) GRAYI Parry MS.—Distinguished from *A. pectinatus* by the broader leaflets, which are 1-1½ inches long by 1½-2½ lines broad, quite strongly veined, and by the somewhat thinner pod, ascending instead of deflexed. The flowers are "light yellow."—On the gravelly ridges bordering Owl Creek valley.—S. WATSON.

126. ASTER (ORTHOMERIS) PARRYI.—A span high, hoary, with a thin loose tomentum; stems several from a rather woody rootstock, simple, the naked peduncle-like summit bearing a single large head; leaves spatulate, cuspidate; scales of the involucre in two series, oblong-lanceolate, very much acuminate, cinereous-pubescent; rays numerous, white, over half an inch in length; akenes very white-villous.—A. GRAY.

144. TOWNSENDIA PARRYI.—Perennial, canescently pubescent; the caudex very short; leaves rosulate, obovate-spatulate, often apiculate, tapering into a petiole of about an inch in length; peduncles stout (2-4 inches long), solitary or several, somewhat leaf-bearing below, naked above and bearing single large heads; scales of the involucre in 3 or 4 series, lanceolate, acute, herbaceous, with scarious lacerate-ciliate margins, the inner ones acuminate; rays bright blue, double the length of the involucre; pappus the same in rays and disk, persistent, of stout and unequal barbellate bristles, a little longer than the akenes.—In the Wind River Range at 9,000 feet alt. (referred to as *T. scapigera* on p. 13). This very beautiful daisy is closely related to *T. scapigera*, and has much the same foliage and a similar pappus and achenium, but the heads are fully as large as those of *T. grandiflora* (1¾ to 2 inches broad), are supported on very stout stalks, and have the rays bright blue. The involucral scales are more pointed than in *T. scapigera*, and the leaves are usually apiculated, as they are not in the latter.

With very fine specimens of the above, Dr. Parry has also collected *T. spathulata* Nutt. (Nos. 142 and 145), and a single plant of a very different species which he proposes to call

T. CONDENSATA (no number. See p. 106).—It has a proper caudex two inches long, marked with the scars of former leaves, and at the top bears a dense mass of small, oblong-spatulate, white-hairy leaves, and, buried among them, a single sessile head rather larger than that of *T. sericea.* The involucre is composed of numerous very narrow acuminate scales, which are lacerate-ciliate along the scarious margin. The pappus consists of rather long barbellate bristles, that of the (infertile?) rays similar but scantier. The rays are pale pink, and about eight lines long, and the disk-florets exceedingly numerous. Not having seen a specimen of Nuttall's *T. incana,* I have some doubt as to whether this may not be his plant of that name. If not, it may properly bear the name which Dr. Parry has proposed. It grew on a high peak in northwestern Wyoming.—D. C. EATON.

164. APLOPAPPUS (STENOTUS) MULTICAULIS.—*Stenotus multicaulis* Nutt., Torr. and Gray, Flora. Wind River.—An interesting rediscovery of this species, which seems to hold truly distinct from *A. acaulis,* which is also in the collection (157).—A. GRAY.

150. SCHKUHRIA INTEGRIFOLIA.—Hoary-puberulent, becoming glabrate; scapiform flowering stems a span high from a branching caudex, leafy only at base, bearing one to four or five loosely corymbose heads; leaves alternate, thickish and coriaceous, oval or sometimes oblong, entire, lightly 3-nerved, abruptly narrowed into a slender petiole; scales of the hemispherical involucre 10-14, oblong-lanceolate, acute, shorter than the disk; flowers yellow; rays 6-9, exserted, oblong, often 3-toothed; akenes linear-cuneate and 4-angled; paleæ of the pappus linear-lanceolate, hyaline, mucronate or short-awned by the excurrence of the stout midrib or else in the outermost flowers oblong and pointless.—Wind River valley, on high gypseous ridges.

A narrow-leaved form of this ambiguous composita (var. *oblongifolia*) was collected by Prof. Newberry in McComb's expedition several years ago, at "San Juan" (either in Utah or New Mexico); and Dr. Parry has now found it much farther north. The character here given is copied from a still unpublished revision which I have recently made of the genus, as now extended according to the views of Bentham in the Genera Plantarum, where it is made to include *Achyropappus* (of which section we have *S. Neo-Mexicana, S. Bigelowii, S. Woodhousei, S. pedata,* and *S. biternata,* all but the first published by me under *Bahia* or *Achyropappus*; and now the present species adds a peculiar section, *Platyschkuhria,* with perennial root, peculiar foliage and habit, but the head and flowers of *Achyropappus.*—A. GRAY.

153. ARNICA PARRYI.—About a foot high, hirsute and glandular; stem simple, naked above, bearing (excepting bracts) only one or two pairs of cauline leaves and 1-5 rather small heads; radical and lowest cauline leaves ovate or ovate-lanceolate with obtuse or acute base tapering into a short margined petiole, lightly 3-5-pliveined, acutely denticulate; the others small and sessile or bract-like; lateral peduncles short; involucre somewhat turbinate; rays none; akenes almost glabrous: pappus densely barbellate in the manner of *A. mollis.*—*A. angustifolia,* var. *discoidea latifolia* Gray in Sill. Jour. 33, p. 238. *A. angustifolia,* var. *eradiata* Gray in Proc. Acad. Philad., 1863, p. 68. Mountains of Colorado (Parry, Hall and Harbour, Greene), and now found by Dr. Parry in Wyoming. Rev. Mr. Nevius sends a specimen from the mountains in Oregon. Allied on one hand to *A. mollis,* on the other to broad leaved forms of *A. alpina.* Seemingly a well marked species in a genus the species of which are hard to limit.*—A. GRAY.

156. ARNICA FOLIOSA Nutt.—*A. Chamissonis* Torr. and Gray, in part. This is a dwarf and less downy form of a species which abounds from the Rocky Mountains to

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* Our North American species throughout appear to have yellow anthers and more or less hairy corolla-tube,—except the two peculiar to Unalaska and the other Aleutian Islands, which have blackish anthers. Both were collected by Harrington and Dall in the exploration under the command of the latter; and they seem to be distinct, although Herder has lately combined them. *A. Unalaschkensis* has the tube of the corolla wholly glabrous. This is said to be the case in the original description of *A. obtusifolia* Less., but in our specimens the many jointed hairs common in the genus certainly occur. The *A. Chamissonis* of Schmidt's Flora Sachaliensis has the same dark anthers, and in foliage also differs considerably from the original *A. Chamissonis.*—A. GRAY.

the Sierra Nevada, in the latter region passing into var. *incana*, a densely white-tomentose variety. It is Nuttall's *A. foliosa*, which I had referred to *A. Chamissonis*, incorrectly, as I am now convinced, but all these species seem to run together inextricably. Nuttall's name is a good one, and so, on the whole, is the species which on a survey of the genus it seems necessary to revive.—A. GRAY.

202. PHELIPÆA (APHYLLON) LUTEA.—Resembles *P. fasciculata*; but the whole plant is of a light yellow color and more glandular-hairy; peduncles only about twice the length of the flower; corolla sulphur-yellow.—Dry and sandy hillsides, Owl Creek; parasitic on roots of grasses.—C. C. PARRY.

215. PEDICULARIS PARRYI Gray, *var.* PURPUREA.—Abundant in pine woods at the foot of Yellowstone Lake. I do not find any marked characters to distinguish this from *Pedicularis Parryi* of the Colorado Rocky Mountains, except the larger dull *purple* flowers, the lanulose-ciliate bracts, filaments slightly hairy, and leaves more sharply serrate, with the divisions *broader* and *less* divaricate.—C. C. PARRY.

218. ORTHOCARPUS PARRYI.—Differs from *O. pallescens* Gray in somewhat greater height (almost a foot high) and in the close and short cinereous pubescence; corolla broader and yellowish, its more decidedly trisaccate lower lip equalling in length the broad galea, its 3 lobes equal, oval, obtuse, about the length of the saccate portion.—Pacific Springs, etc. Flowers 7 lines long; the lower rather distant, in the axils of green and foliaceous laciniate-pinnatifid bracts; calyx 2-cleft to the middle, nearly equalling the yellowish corolla and apparently slightly yellowish.—A. GRAY.

CAREX TENUIROSTRIS Olney.—Spike ovate or nearly round (8–11 mm. long, 7–10 wide), composed of 5–10 or more spikelets in a dense head staminate at the base; bracts short, leafy, lower margins hyaline; stigmas 2; perigynium narrow, ovate, lanceolate (3·2 mm. long, ·8 mm. wide), tapering to a very slender beak with an obliquely cut membranous orifice fringed at top, faintly nerved, doubly serrate and winged on the margins from the base of the oblique cut to half way down, longer than the entire ovate acute hyaline green nerved scale (2–2·1 mm. long, 1–1·5 broad), never hispid; achenium straw colored, oblong, stiped (1·4 mm. long, ·6 mm. wide).—Stipe 4 mm. long; achenium 1·4 mm.; style 2·2 mm.; stigmas ·8–4·8 mm.; root fibrous, culm 6–8 cm. high, leaves flat; margin finely serrated, rough and pointed at top, narrow, and shorter than culm.

It resembles *Carex Haydeniana* in size, leaves and general aspect. It differs in the color of its spikes, its bracts, but principally in its perigynium which is narrower, and in its orifice fringed at top, and in this differing from its other close ally *C. leporina* and from *C. festiva* more remote. From *C. festiva* it differs as indicated, and in the wings and serratures of the perigynium not extending to the base.—S. T. OLNEY.

307. ISOETES BOLANDERI Engelm.—Trunk deeply 2-lobed; leaves (5–20, 2–4½ in. long) 4-angled, slender, tapering to a very fine point, bright green, soft; epidermis cells elongated; with stomata, but without peripherical bast bundles; sporocarp mostly oblong, covered about ⅓ or ¼ by the velum, unspotted; macrospores (0·30–0·45 mm. wide) beset with minute points and wrinkles; microspores (0·026–0·31 mm. long) more or less papillose or spinulose, deep brown.—In ponds and shallow lakes on the Sierra Nevada of California, at an altitude of 5,000–10,000 feet, "scattered or rarely in small patches" (Tuolumne, Mount Dana, Mono-trail, Cisco, Mary's Lake, *H. Bolander*, 1866 and 1870), and on the Rocky Mountains, "densely cæspitose (Yellowstone Lake 7,400 feet alt. *C. C. Parry*, No. 307, 1873).

This species represents in the western mountain regions our eastern wide-spread *Isoëtes echinospora* var. *Braunii*, and the very local *I. saccharata*. Both collectors found it growing in soft mud covering gravel, and always submerged, but the abundant stomata would seem to indicate that the plant, at times, vegetates out of water. Leaves very slender, ⅓-½ lines in diameter in the lower third, very broad winged below and towards the base. The minute, mostly pointed warts on the macrospores are often confluent, and then represent short wormlike wrinkles; in some specimens I find them almost obliterated. The specimens from Yellowstone Lake are characterized by rather smaller macrospores (0·28 – 0·38 mm. wide) and a little smaller (0·026 – 0·029 mm.) almost smooth microspores, and may be distinguished as var. *Parryi*.

The only other species of Isoëtes, thus far found in the western mountains and on the Pacific slope, are:

ISOETES PYGMÆA Engelm.—Very submerged, few (5-10), short (½ to 1 inch), stout, rapidly tapering dark-green leaves, with very short, often even square epidermis cells, without stomata or bast-bundles; circular sporocarp with a very narrow velum; macrospores 0·36-0·50 mm. wide, marked with smaller and more regular, rarely confluent, rather sharp points; microspores (0·024-0·027 mm. long) brown, very minutely papillose or almost smooth.—In large patches in mud, covering gravel, deeply submerged in running water, on the Mono-trail, eastern declivity of the Sierra Nevada, 7000 feet alt., *H. Bolander*, 1866. Closely allied to the last species, distinguished by its stout, short leaves without stomata, and the markings of the larger macrospores, etc.; in many respects near *I. lacustris.*

Isoetes Nuttallii A. Braun in litt.—Terrestrial, trunk scarcely lobed; leaves (20-60, 3-7 in. long) 3-angled, slender, firm, erect, light-green, with numerous stomata and 3 peripherical bast-bundles; sporocarp mostly oblong, entirely covered by the velum; macrospores (0·35-0·52 mm. wide) densely covered with minute but prominent, rounded warts; microspores (0·025-0·028 mm. long) papillose, deep brown.—On damp flats or springy declivities in Oregon; on the Columbia, *Th. Nuttall*, 1833; Camass Prairies of the Cœur d'Aleines, *Chs. Geyer*, 1843; Willamette valley, *E. Hall*, No. 693, 1871. Thin but firm leaves, as most land Isoëtes have, with three strong bast-bundles corresponding to the 3 angles. Trunk rhombic in transverse section, only superficially divided by a shallow groove into two lobes. Closely allied to *I. melanopoda* of the Mississippi Valley, which Mr. Hall lately discovered also in Texas, but resembling in the velum the two Florida species *I. flaccida* and *I. Chapmani.*

Isoetes echinospora Dur., var. Braunii Engelm.—In the Uintah Mountains, at 9500 feet alt., *S. Watson.* The westernmost and the highest known locality of this species.—G. Engelmann.

Æcidium Psoraleæ.—Spots none; peridia abundant, generally occupying all the lower surface of the leaf, rarely a few on the upper surface, short margin crenulate; spores sub-globose and sub-elliptical, brownish yellow when fresh, yellowish when dry, ·0007-·0008 inch long.—Parasitic on leaves of *Psoralea floribunda*, Colorado Territory.—C. H. Peck.

Æcidium Parryi.—Spots none; peridia usually occupying all the lower surface of the leaf, prominent, bright-colored, margin subentire; spores subglobose, bright chrome yellow, ·0008-·0009 inch in diameter.—Parasitic on leaves of *Smelowskia calycina* Meyer. Wyoming Territory.—C. H. Peck.

REVIEWS AND BOOK NOTICES.

Revision of the Echini.[*]—The third part of this elaborate work, the first and second parts of which we noticed in the preceding volume of this journal, has appeared printed in the same beautiful style as the preceding portion.

The present part contains the descriptions of the species of recent Echini (sea urchins), with a full discussion of the ordinal and subordinal characters. The plates are beautifully executed with many details both of the external parts and the internal anatomy.

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[*] Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College. No. vii. Revision of the Echini. By Alexander Agassiz. Part iii with 45 plates and the plates illustrating Part iv. Cambridge, 1873. Royal 8vo. pp. 383-628.